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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/008,525	06/29/1998	YOUNG-WOO PARK	2557-000048/US	6330
30593	7590	04/13/2005	EXAMINER	
HARNES, DICKEY & PIERCE, P.L.C.			PHAM, HOAI V	
P.O. BOX 8910			ART UNIT	
RESTON, VA 20195			PAPER NUMBER	

2814

DATE MAILED: 04/13/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/008,525

Applicant(s)

PARK ET AL.

Examiner

Hoai v. Pham

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 31 January 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-55 is/are pending in the application.
- 4a) Of the above claim(s) 4,7-15,19-43 and 47-55 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3,5,6,16-18 and 44-46 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Election/Restriction***

1. Applicant's election with traverse of Species 1 in the reply filed on 01/31/05 and figures 4-7 in Paper No. 19 is acknowledged.
2. Claims 4, 7-15, 19-43, and 47-55 are withdrawn from further consideration because these claims do not read on the species of figs. 4-7.

### ***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 44-46 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 44, the steps of "forming an oxidation preventing layer; forming a second insulating layer; forming a contact hole exposing a portion of the semiconductor; forming a storage electrode connected to the portion of the semiconductor substrate through the contact hole; forming a dielectric layer; and forming a plate electrode." render the claim indefinite. It is not clear where the oxidation preventing layer; the second insulating layer; the storage electrode; the dielectric layer; and the plate electrode are formed on.

***Claim Rejections - 35 USC § 102***

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 1-3, 5, 17, 18, and 44-46 are rejected under 35 U.S.C. 102(e) as being anticipated by Tsai [U.S. Pat. 5,763,306].

With respect to claims 1, 44 and 45, Tsai (figs. 2A-11B, cols. 3-7) discloses a method for manufacturing a semiconductor memory device comprising the steps of:

forming a first insulating layer (9) on a semiconductor substrate (1) (see fig. 2A);  
forming a plurality of bit lines (10b) on the first insulating layer (9) (see fig. 3B);  
forming an oxidation preventing layer (11) over substantially the entire surface of the bit lines (10b) and the first insulating layer (9) (see fig. 3B);  
forming a second insulating layer (12) on the plurality of bit lines (10b);  
forming a contact hole (17b) exposing a portion of the semiconductor substrate (1) by patterning the second insulating layer (12), and the first insulating layer (9) (see fig. 7B);  
forming a storage electrode (19, 20) over the second insulating layer (12) and connected to the portion of the semiconductor substrate (1) through the contact hole (17b) (see fig. 8B); and

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sequentially forming a dielectric layer (21) and a plate electrode (22) on the storage electrode (19, 20) (see fig. 11B).

With respect to claims 2 and 46, Tsai discloses that the oxidation preventing layer (11) comprises a nitride layer (col. 4, lines 58-60).

With respect to claim 3, Tsai discloses that the nitride layer (11) is formed to a thickness equal to or less than about 1,000 angstroms (col. 4, lines 62-65).

With respect to claim 5, Tsai discloses that the nitride layer (11) is formed by a low pressure chemical vapor deposition (LPCVD) process (col. 4, lines 62-63).

With respect to claim 17, Tsai discloses that the first and second insulating layers (9 and 12) comprise a borophosphosilicate glass (BPSG) (col. 4, lines 29-33 and col. 5, lines 1-4).

With respect to claim 18, Tsai discloses that a nitride layer (13) and an oxide layer (14) are sequentially formed on the second insulating layer (12) prior to the step of forming the contact hole (see fig. 4B and col. 5, lines 9-17).

***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

9. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tsai [U.S. Pat. 5,763,306] in view of Lu et al. [U.S. Pat. 5,595,928].

Tsai discloses that the LPCVD process is performed at temperature of about 500°-850°C (col. 4, lines 63-64). Tsai does not mention of using a gas mixture of dichlorosilane and ammonia as a reactant gas to form the nitride layer. However, Lu et al. discloses that using a gas mixture of dichlorosilane and ammonia as a reactant gas to form the nitride layer (26) (col. 5, lines 37-45). Therefore, it would have been obvious to one having skill in the art at the time the invention was made to use a gas mixture of

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dichlorosilane and ammonia as a reactant gas as taught by Lu et al. into the process of Tsai in order to form a conformal nitride layer (see col. 5, lines 37-38).

10. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tsai [U.S. Pat. 5,763,306] in view of Applicant Admitted Prior Art (fig. 1, pages 1-2).

Tsai substantially discloses all the limitations as claimed above except the contact hole has a sidewall and wherein the step of forming a storage electrode is preceded by a step of forming a spacer on the sidewall of the contact hole. However, Applicant Admitted Prior Art discloses that the contact hole has a sidewall (28) and wherein the step of forming a storage electrode is preceded by a step of forming a spacer on the sidewall of the contact hole. Therefore, it would have been obvious to one having skill in the art at the time the invention was made to form the spacer on the sidewall of the contact hole as taught by Applicant Admitted Prior Art into the process of Tsai in order to prevent oxygen diffused through the sidewall of the contact hole (see page 3, lines 6-9).

### ***Conclusion***

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hoai v. Pham whose telephone number is 571-272-1715. The examiner can normally be reached on M-F.

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12. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael M. Fahmy can be reached on 571-272-1705. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

13. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



HOAI PHAM  
PRIMARY EXAMINER